The Story of a Lake

Circular 644 : University of Illinois : College of Agriculture
Extension Service in Agriculture and Home Economics

This circular is based on a critical study by Carl B. Brown, J. B. Stall, and E. E. DeTurk, of the conditions in Lake Decatur and the surrounding watershed (see *The Causes and Effects of Sedimentation in Lake Decatur,* Bulletin 37, State of Illinois, Department of Registration and Education, State Water Survey Division).

The story has been told here by E. D. WALKER, Extension Soil Conservationist and Associate Professor in Agronomy Extension, College of Agriculture, University of Illinois. The Decatur *Herald-Review,* the Decatur Chamber of Commerce, and the Bloomington *Daily Pantagraph* were kind enough to provide many of the illustrations. For several others, credit is due to W. F. Purnell, Assistant Extension Soil Conservationist.

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Urbana, Illinois, June, 1949

A great many people . . .

are involved in this story of a small lake in central Illinois. It concerns first the city people who built the lake and live near it, and the farmers whose lands drain down into the lake. But it really is of vital importance to all the people of this country — everyone, without exception.

The lessons in this story are crystal clear. Either we as a nation must find a way to hold our fertile soil where it is, or some day we shall be hungry as older nations of this world are now hungry.

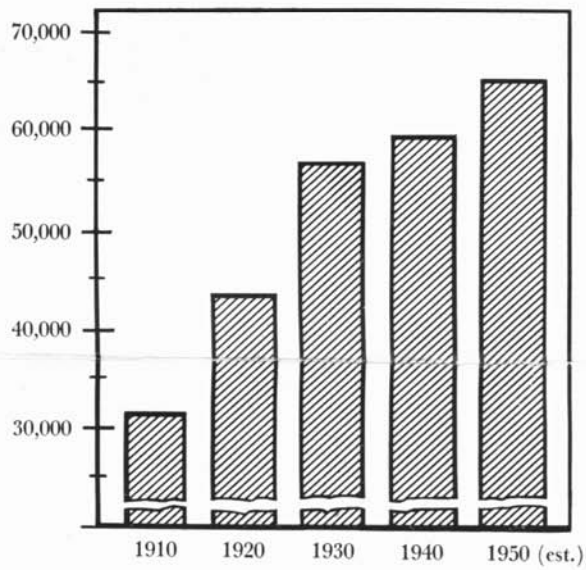
Many of our farmers won't have to wait until they are through with their land to see that it has literally washed out from under their plows. It is being washed away now — how fast is indicated by the story of this lake. We may be enjoying prosperity because of improved varieties of crops — hybrid corn, for example — but this prosperity cannot last unless the soil lasts.

This story, we trust, will convince more farmers to take the steps needed to save their soils, and will stir others to take an interest in the national problem of conserving our soils — our greatest natural resource, and one we cannot replace.

THE CITY OF DECATUR NEEDED A BETTER WATER SUPPLY

Some years ago the citizens of Decatur, Illinois, faced the problem of getting more water. The population was growing, and so were the many processing and manufacturing plants which were important to the life and prosperity of the city.

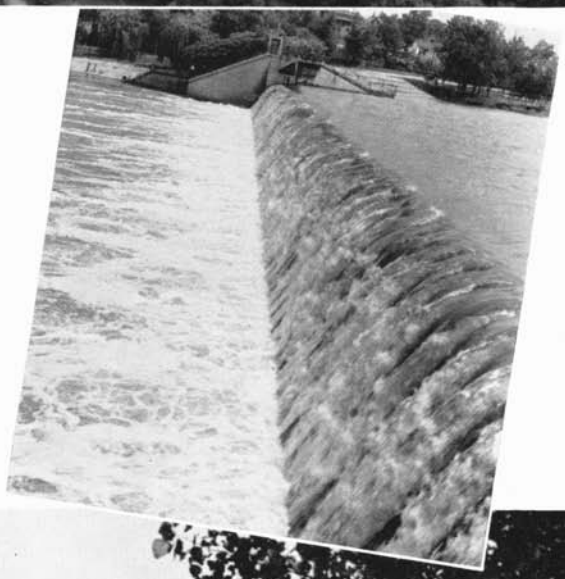
Past the edge of the city flows a river which seemed to hold an answer to the problem. It was the Sangamon, a stream draining nearly 600,000 acres of the black prairie farm lands above Decatur. The people of the city looked at the ample flow of the Sangamon, and decided to do what seemed easy and logical — store the water and use it.



Decatur's population, as shown by the chart, will climb to an estimated 65,300 by 1950.

SO A DAM WAS BUILT AND A BEAUTIFUL LAKE WAS MADE

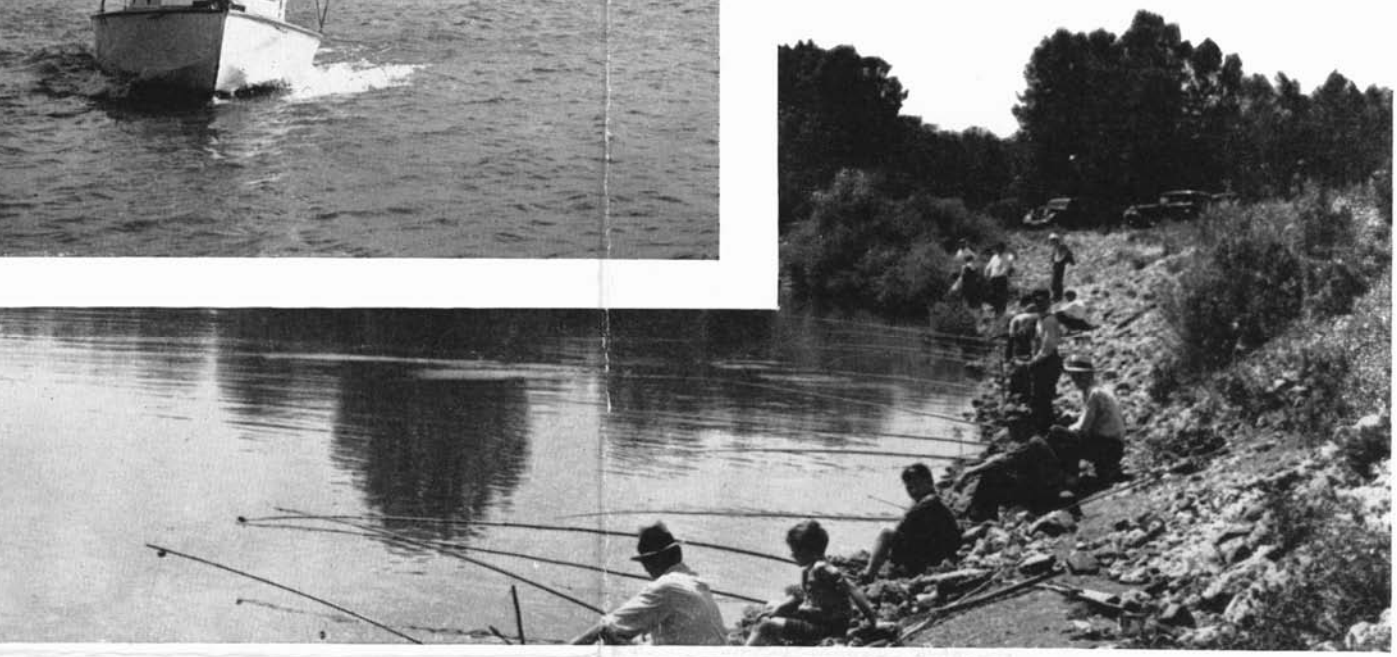
The dam was completed in 1922 — more than 25 years ago — at a cost of 2 million dollars. The lake which it formed had an area of 2,800 acres, and extended about 8 miles upstream from the city limits. It promised to supply plenty of water for people and industry indefinitely.



Not only has the lake meant a fine water supply for the city, but it has also provided a great open area where thousands of people from Decatur and the surrounding country could boat, fish, swim, and enjoy other kinds of healthful, joyous recreation. Homes have been built around the edge of the lake.

It seems like a pretty picture — a beautiful lake and a prosperous city surrounded by some of the most fertile farm land in Illinois.

But that isn't the whole picture, for disturbing problems have developed since the lake was formed.

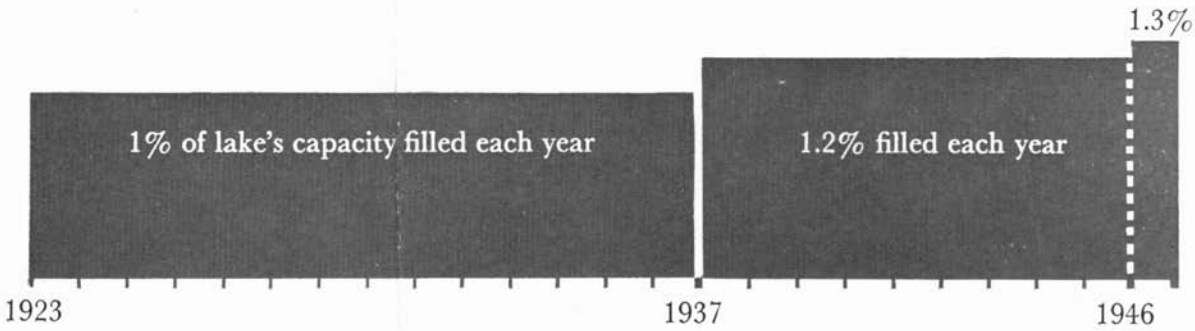


The lake is beginning to die!

Through the years since 1922 something has been happening in the lake itself. Slowly but surely Lake Decatur is dying. It is being smothered and strangled by millions of tons of silt washed in from the farm land in the watershed above the lake.

In 1946, just 24 years after the lake was built, more than a fourth of its capacity had been filled with precious topsoil. The lake can now supply less than three-fourths as much water as it could when it was made, yet the growing city and its industries need more water than ever.

If there had been no silting, the lake would have served the city well for 78 years — despite the growth in population and industry. But now, to be safe against possible drouth, more water storage will need to be



The yearly rate of sediment deposit was one-fifth more from 1937 to 1946 than during the first 14 years of the lake's life. Since 1946 soil has found its way into the lake at a still faster rate.

provided by 1956, when the lake will be only 34 years old.

The tragic loss of water supply to the city of Decatur is not the only loss to the people of the area. As silt comes in, it spoils recreation spots in and around the lake. Boats stick on mud bars, water is too shallow for bathing beaches, unsightly weeds mar the landscape. A lot of summertime fun is spoiled for children and adults alike.

These are the local and the immediate problems. They are of concern to the people of Decatur and others who like to play in and around the lake. At first we might think that they are the only problems and that with some further outlay of skill and money they could be solved without much trouble.

But the fact is that the conditions at Lake Decatur point up a much bigger and much more serious situation.

What is happening here is happening all over our country. Because of uncontrolled erosion we are losing the food-producing layer of our soil.

That rich topsoil now lying in the bottom of Lake Decatur is, in the words of "Ding" Darling, famous cartoonist and conservationist, "beefsteak and potatoes, roast duck, ham and eggs, and bread and butter with jam on it."

It is also bright woolen sweaters, Easter hats, mittens, shoes, shirts, coats, and Dad's new tweed suit.

So we see here a problem that concerns those who own farms and those who live on what our farms produce. And that takes in all of us.

The lake holds less than three-fourths as much water as when it was built in 1922. An average loss in capacity of more than 1 percent a year may not sound serious — until it is multiplied by 25!

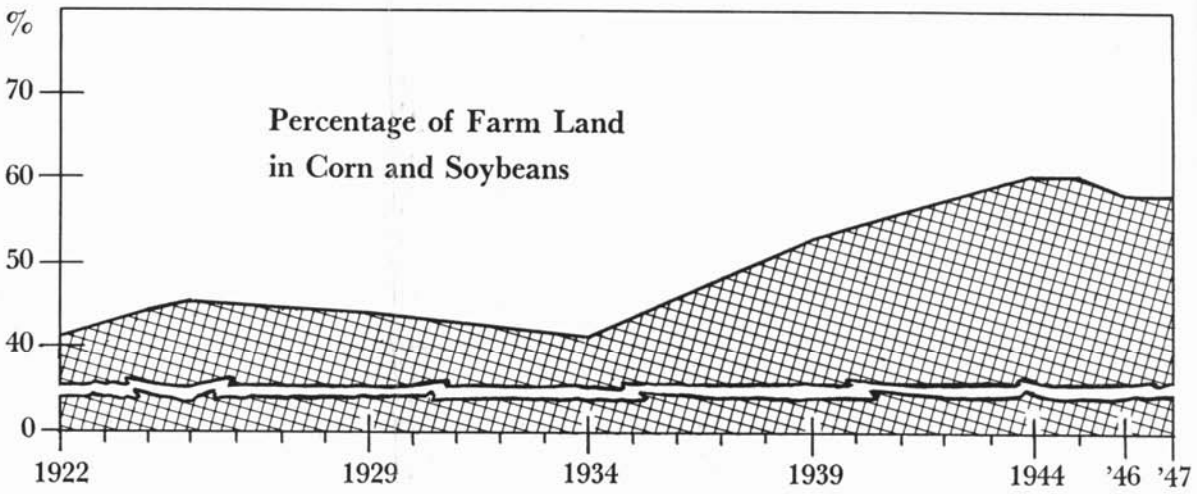
A RICH FARMING AREA SUFFERS

The Sangamon river watershed above Decatur is in the fine farming area of east-central Illinois. Nine-tenths of the land is dark prairie soil, and about one-tenth is light-colored timber soil. Nearly all the land is in farms; most of these farms raise grains — corn, oats, wheat, and, more recently, soybeans. A large part of the area is therefore plowed and cultivated — and so subject to erosion.

But in 1922 the threat of erosion aroused no concern. No thought was given to the need for managing the land in such a way as to protect both the land and the lake. Hadn't the farms been operated for years with little damage? Couldn't things stay as they had been? If we had looked at the lake and the land closely enough and early enough, we would have found the answer. And the answer would have been *No*.

The first sign of trouble appeared in the small bays and inlets. They began to fill with silt. Men making a partial survey in 1930 found deposits of silt 1 to 4 feet deep in various spots. A complete survey made in 1936 showed that in the 14 years since the lake was built sediment had been filling it at the rate of 1 percent of its capacity each year. This survey was made jointly by the U. S. Soil Conservation Service, State Water Survey, Illinois Agricultural Experiment Station, and the city of Decatur.

This is topsoil from a soybean field on its way into the lake — lost to food production and a costly nuisance in the lake. Since 1922 fertile topsoil equal to that from some 7,500 acres has been buried in Lake Decatur.



The increased acreage of corn and soybeans in Macon, Piatt, De Witt, Champaign, Ford, and McLean counties parallels the increase in the rate of sediment deposit. The Lake Decatur watershed lies in these six counties.

As years went along, more signs of trouble appeared. Bays and inlets continued to fill — some completely. Mud bars showed in the upper part of the lake and became covered with willows, cattails, and grasses. Boats ran aground on the mud bars and had trouble reaching their docks. By 1941 there was so much concern that the city set up the Upper Sangamon Valley Conservation Service and employed two soil conservationists to help with the problem.

In 1946 a second survey, made by the same agencies as in 1936, showed startling changes. By that time silt deposits had filled in the lake until its area was 201 acres less than in 1922, and its capacity was 26 percent less. In the 10 years from 1936 to 1946 good soil equal to the top 7 inches from 3,400 acres of land — more than half a section a year — had been torn away and carried into the lake.

With this soil went available nitrogen worth $92,000 and available phosphorus worth $35,000. During the entire 24 years the losses of these materials alone totaled a third of a million dollars. Had they been left on the cropland, they were all ready to be changed into corn and wheat and soybeans. The displaced soil also contained millions of pounds of reserve nitrogen and phosphorus that would have later become available to crops.

Why has the rate of erosion increased 20 percent since the early days of Lake Decatur? The answer lies in the marked change in the use of the land. Back in 1922, the intertilled, erosion-producing crops, corn and soybeans, were grown on 41 percent of the farm land in the six counties from which water flows into the lake. The other 59 percent was used for small grains, hay, and other crops that hold the soil better than tilled crops.

By 1945 the corn acreage had decreased slightly, but the soybean acreage had expanded until these two crops occupied 60 percent of the farm area. Total acreage of these crops has since declined slightly. In some areas, however, 80 percent of the land is still in corn and soybeans.

This leaves little room for the close-growing crops which help to hold the soil.

AND A NATION GROWS POORER

Decatur can, and doubtless will, make some shift to solve its problems of water supply and recreation. But nobody will or can put back the soil and plant food which have been washed off the good farm land of the upper Sangamon valley. That is forever lost. As a result, the nation is poorer, and so are you and I.

Lake Decatur serves merely as a mirror to reflect our wasteful methods of land management. Much the same story can be told of other lakes in the state, particularly those where a large part of the watershed is in cultivation. Spring Lake, at Macomb, is approximately half full of sediment. Lake Calhoun, near Galva, built as a recreation center, is so nearly full that it has lost much of its value. The acreages of corn and soybeans run high in both watersheds. On one section of land above Lake Calhoun, 520 of the 640 acres were in corn in 1947 and the corn was planted up and down the slope.

Even though there is not always a lake to catch the runaway soil, we know that the same serious problem of soil loss exists in all parts of our state, and in all parts of our country. When the Mississippi river is at flood stage, the equivalent of the topsoil from a 40-acre farm is carried past Vicksburg, Mississippi, every minute, according to careful estimates of engineers. Much of that topsoil comes from Illinois farms. Evidence of this fact lies in the eroded fields, and even abandoned land, in all parts of the state.

Best available estimates show that about 9 percent of Illinois land is subject to destructive erosion, 9 percent to serious erosion, and 59 percent to harmful erosion. This means that over three-fourths of the land in the state is threatened with erosion, and that its fertility will continue to be depleted unless correct farming methods are more widely adopted.

A wise combination of crops on the level land, trees on the slopes.

BUT OUR LAND CAN BE SAVED

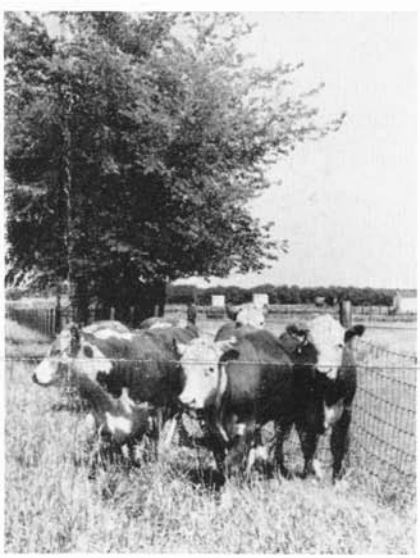
Those of us who are farmers have a heavy responsibility to do all we can to keep the good topsoil on our lands — lands we hold in trust for future generations.

The general pattern of good soil management is clear. To begin with, we should put into crop production only land that can be safely used for that purpose and leave the rest for hay, pasture, and timber.

The next great need is better rotations on the land set aside for crop production. No more than half of even the best land should be planted to intertilled crops such as corn and soybeans in any one year; this leaves a fourth of the land for small grains and a fourth for meadow mixtures of legumes and grasses. On land of low fertility or in greater danger of erosion, the proportion

Steep, eroding slopes like this should be in trees.

Legumes and grasses hold the soil, and provide feed for stock.



A good grass waterway stops gullies before they start.

Curved rows, cutting across the slope on the level, save soil and water — and the crops yield more.

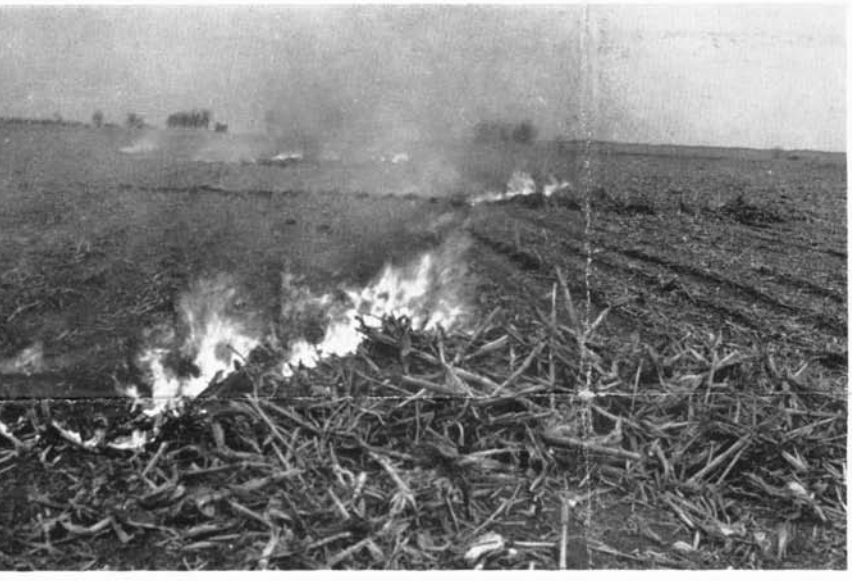
planted to intertilled crops should be cut down to a third, a fourth, or even a fifth, and the acreage of small grain crops and meadow should be correspondingly increased.

High yields of the soil-building legumes and grasses are necessary to make rotations most effective. To get high yields of these crops, soil treatment is essential; limestone, phosphate, and potash are most likely to be needed. Tests that show the actual needs of the soil should be the basis for supplying fertilizer. To be completely successful, a fertility program must include permanent pasture, as well as cropland.

Other measures may be needed on many farms. Sloping land may need grass waterways, contouring, strip cropping, and terracing, and the flatter land may have to be drained. Reforestation, farm woodlot management, and wildlife protection will also come in for attention.

A concrete dam keeps tile and waterway from washing out. Note how crops are contoured.

A farm pond can be used to heal a gully and save water for livestock and family recreation.



Some land must be drained before it can do the best job of producing crops. The top picture shows a machine laying tile to drain excess water off a central Illinois farm. Open-ditch drainage is also commonly used. Growing plenty of legumes and grasses in the rotation is needed to keep soil open and in condition to drain properly.

Before these soil-building legumes and grasses will make good growth, lime and other plant food must be added to much of our land. In the center picture a farmer is liming his field according to the need shown by a careful soil test. Seventy-two soil-testing laboratories in Illinois are guiding farmers in the application of record tonnages of lime, phosphate, and other fertilizers.

In the bottom photograph, something is happening which should never happen. We would not deliberately burn up dollar bills. We do worse when we burn cornstalks and other crop residues. When plowed into the soil such residues decay and form organic matter or humus. This humus helps soil to hold more water, improves its texture and makes it easier to work, and enables it to produce more crops.

DOES CONSERVATION FARMING PAY?

The answer to this question is an emphatic *Yes*. Costs and benefits of soil and water conservation have been studied on farms in several parts of Illinois. Figures derived from the studies show that conservation farming does pay.

All the farms studied showed a better net income after a good conservation program had been put into effect. Among a group of central Illinois farms, those where the best conservation practices were followed returned, as a five-year average, $6.65 an acre more than similar farms where good soil management was not applied. On a 160-acre farm this extra income would total more than $1,000 a year. Farms in other parts of the state showed similar gains from soil conservation practices.

STARTING A CONSERVATION PROGRAM

The first step in getting a conservation program underway on a farm is to outline carefully the soil situation on that particular farm. When this is done, the next step is to write out a detailed plan showing what cropping system and conservation practices will be used, where they will be used, and when. In this way it is possible to make sure that all soil problems will be given the attention they need, and that the conservation measures will be correctly related to one another. On rented farms a good plan can be of further value by becoming the basis for better understanding between the tenant and the landlord.

Those who want help in planning a program of good land management can obtain it from several sources. The UNIVERSITY OF ILLINOIS COLLEGE OF AGRICULTURE, the U. S. SOIL CONSERVATION SERVICE, the farm adviser in each county in the state, and the soil conservation districts, which now include 90 percent or more of the counties in Illinois, all stand ready to help actively in any farmer's program to save his soil.

EVERYONE'S INTEREST IS NEEDED

One of our big national concerns is to have our farm lands used in the best possible way. This is a problem that can be solved only by millions of people demonstrating willingness to do the right thing.

Those of us who own or operate farm land have an obligation to so handle it that we shall keep the precious top inches of fertile soil where they belong. This means farming the "conservation way." Those of us who are not landowners or operators have an obligation too. We can help build public sentiment favoring good soil management and can give our support to public and private movements that will achieve this important goal.

If we take to heart the story told so clearly by this lake in central Illinois, perhaps the damage done here will have been worth what it has cost.

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